



Service Manual

444F2 BACKHOE LOADER

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i02762533

Fuel Priming Pump and Fuel Filter Base - Remove and Install

SMCS - 1258-010; 1260-010; 1261-010-SE; 1262-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Note: Put identification marks on all hoses, on all hose assemblies, on wires and on all tube assemblies for installation purposes. Plug all hose assemblies and tube assemblies. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

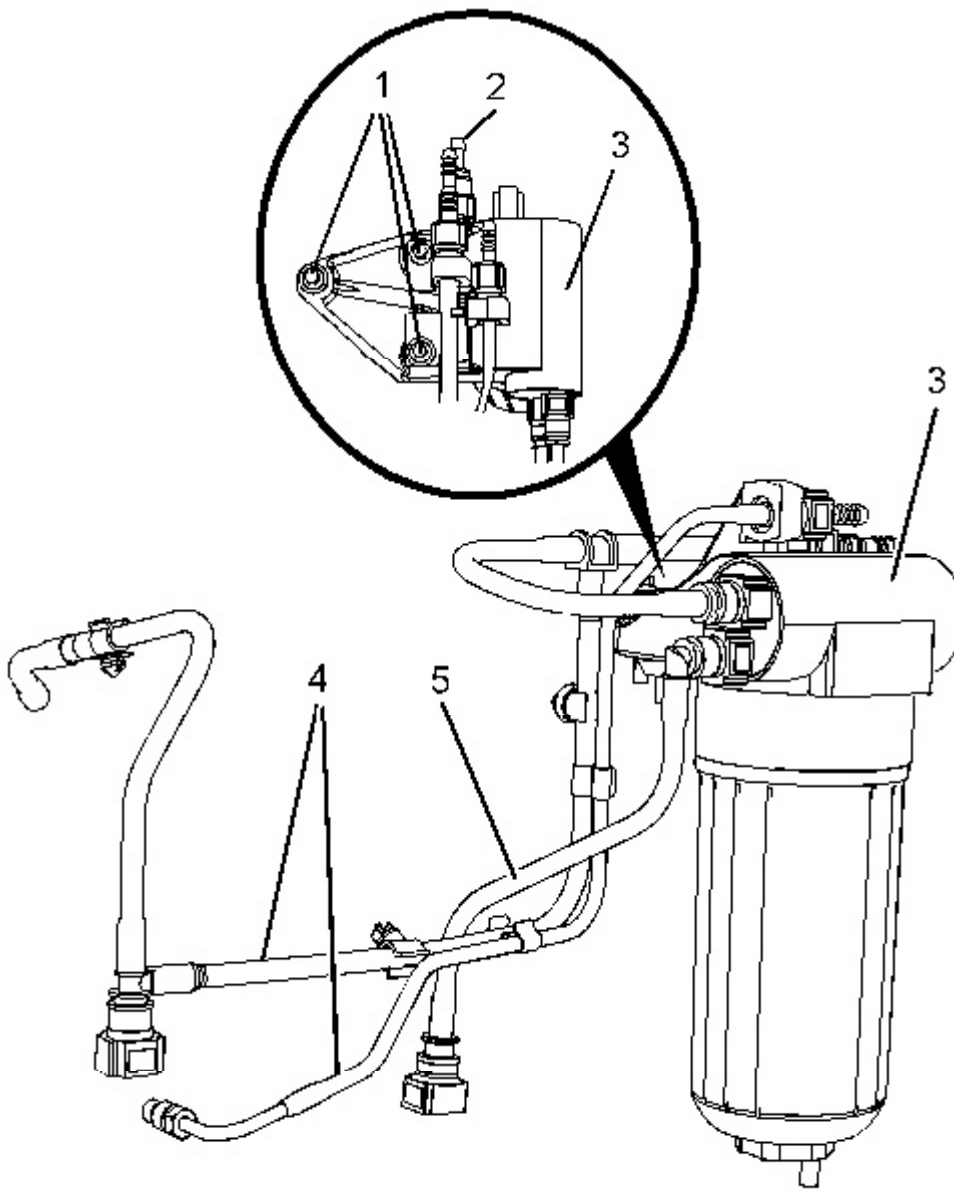


Illustration 1

g01318612

Typical example

1. Turn the fuel supply to the OFF position.
2. Turn the battery disconnect switch to the OFF position.
3. Disconnect plastic tube assemblies (4) and (5) from fuel priming pump (3).
4. Disconnect plastic tube assemblies (4) and (5) from fuel priming pump (3).
5. Disconnect plastic tube assembly (2) from fuel priming pump (3).
6. Plug all the connections on fuel priming pump (3) and plastic tube assemblies (4) and (5).
7. Disconnect the harness assembly from fuel priming pump (3).
8. Support the fuel priming pump. Remove bolts and washers (1) and remove fuel priming pump (3).

Note: Note the location and the orientation of the brackets for the tube assemblies.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

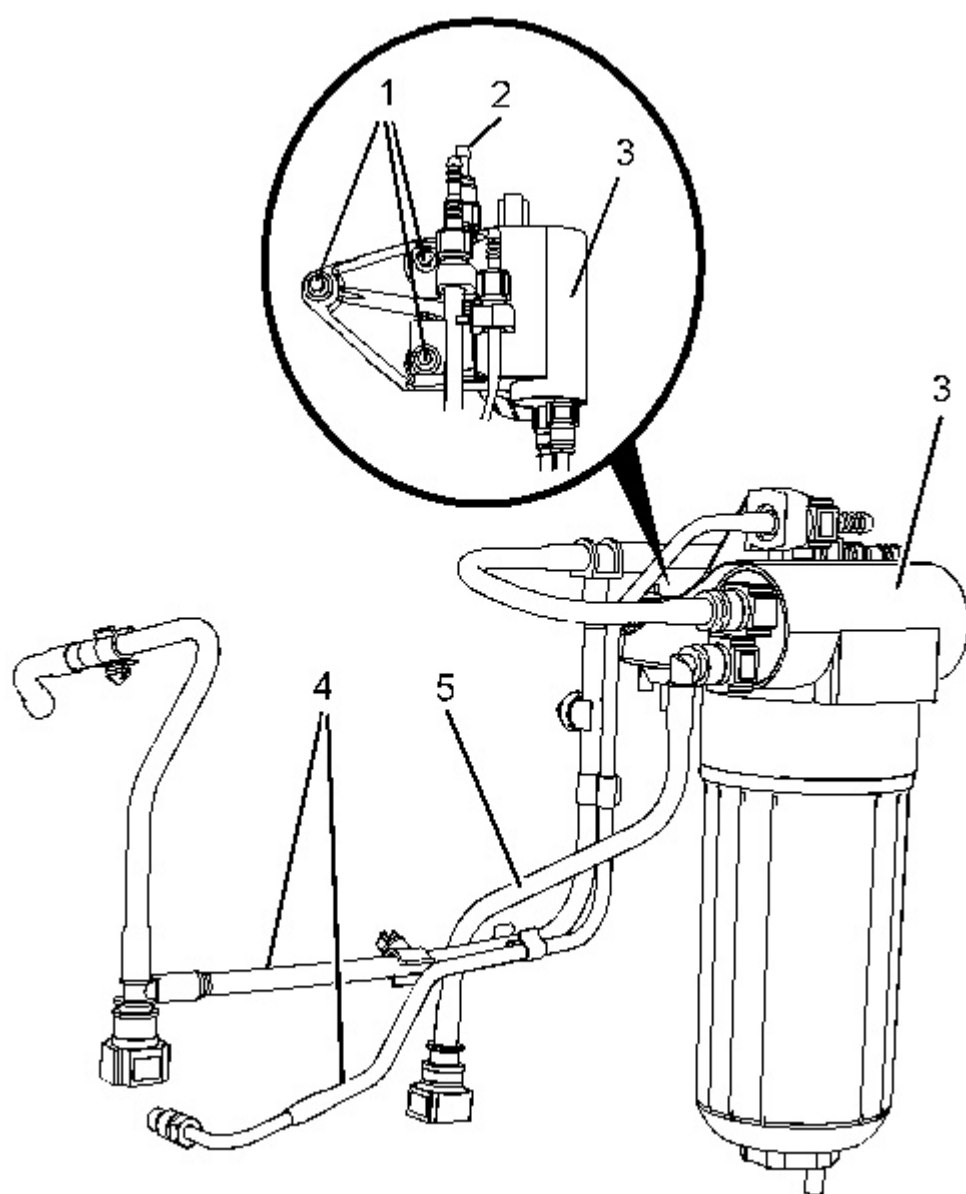


Illustration 2

Typical example

g01318612

1. Ensure that the fuel priming pump is clean and free from wear or damage. If necessary, replace the fuel priming pump as a complete assembly.
2. Position fuel priming pump (3) onto the cylinder head. Install bolts and washers (1). Ensure that any brackets that are retained by the bolts are installed in the correct position. Tighten the bolts to a torque on 9 N·m (80 lb in).
3. Remove all plugs from the fuel priming pump and from the plastic tube assemblies. Connect plastic tube assemblies (4) and (5) to fuel priming pump (3).
4. Connect plastic tube assembly (2) to fuel priming pump (3).
5. Install the harness assembly to fuel priming pump (3).
6. Turn the fuel supply to the ON position.
7. Turn the battery disconnect switch to the ON position.
8. Remove the air from the fuel system. Refer to Operations and Maintenance Manual, "Fuel System - Prime".

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i02762534

Fuel Injection Lines - Remove and Install

SMCS - 1252-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. Turn the fuel supply to the OFF position.
2. Turn the battery disconnect switch to the OFF position.

3. If the engine is equipped with a cover over the fuel injectors remove the cover. Refer to Disassembly and Assembly, "Fuel Injector Cover - Remove and Install".
 4. Remove the breather tube from the valve mechanism cover. Refer to Disassembly and Assembly, "Crankcase Breather- Remove and Install".
-

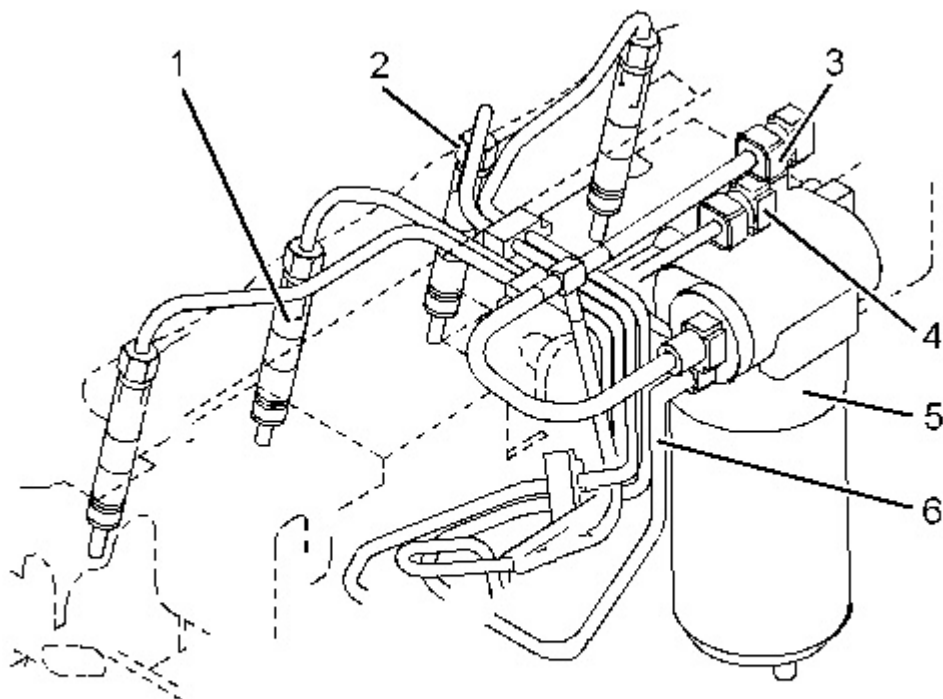


Illustration 1

g01343040

5. Loosen the clip and disconnect plastic tube assembly (3) from fuel priming pump (5).
 6. Loosen the clip and disconnect plastic tube assembly (4) from the fuel return.
 7. Remove plastic tube assembly (6).
 8. Disconnect fuel injection lines (2) at fuel injectors (1).
-

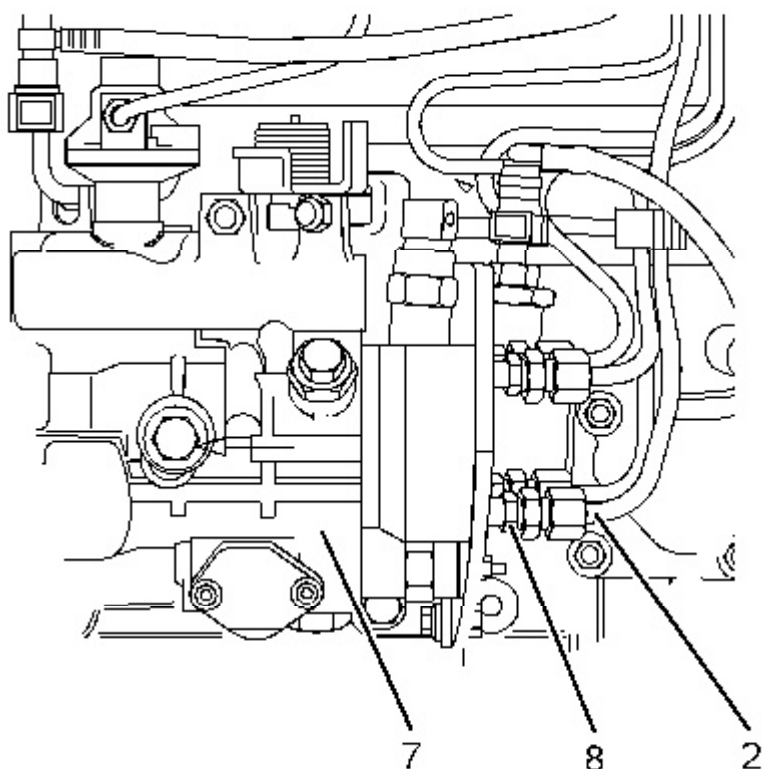


Illustration 2
Typical example

g01319327

9. Disconnect fuel injection lines (2) at fuel injection pump (7). Ensure that connections (8) do not turn.
10. Plug and cap all open ports, fuel injection lines and all tube assemblies.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Inspect the fuel injection lines for damage. Replace any components that are damaged.
-

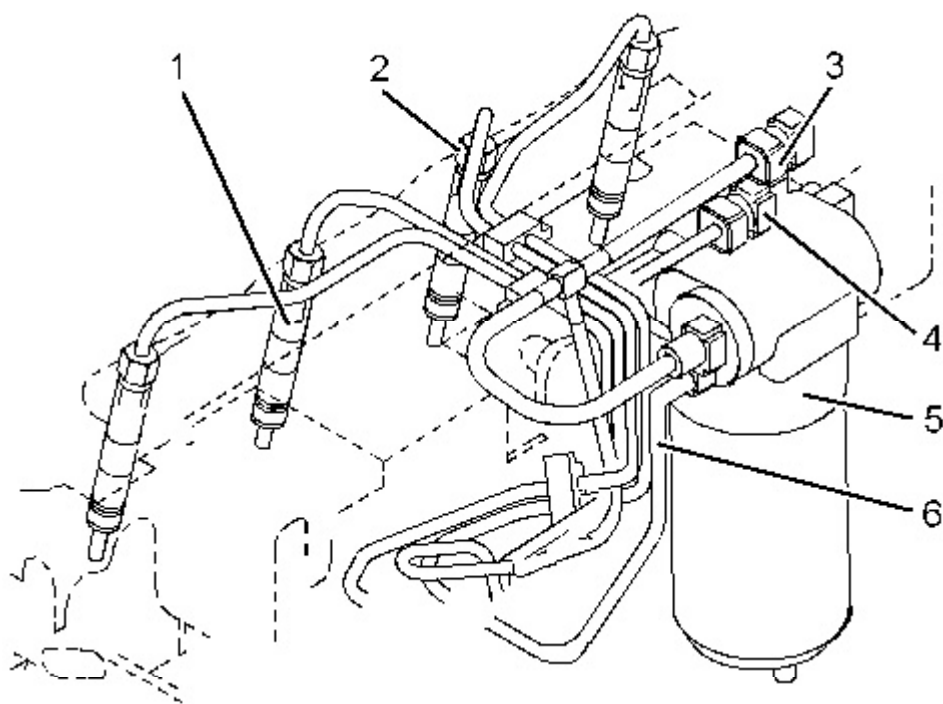


Illustration 3
Typical example

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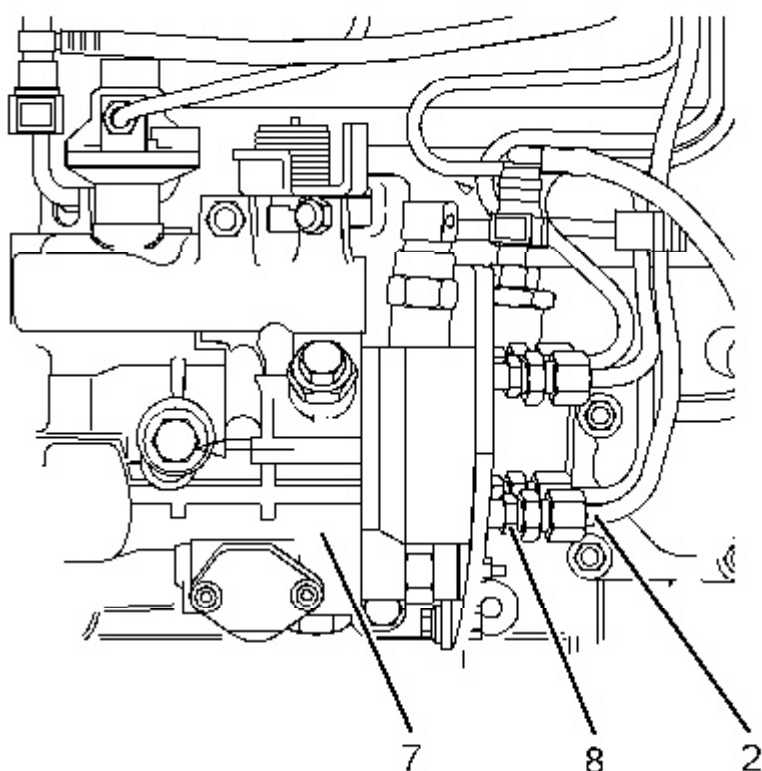


Illustration 4

g01319327

2. Remove the caps from fuel injection pump (7) and from fuel injectors (1). Remove the caps from fuel injection lines (2).
 3. Install fuel injection lines (2). Loosely connect the nuts at both ends of the fuel injection lines.
 4. Tighten fuel injection lines (2) at fuel injector (1) to a torque of 30 N·m (22 lb ft).
 5. Tighten fuel injection lines (2) at fuel injection pump (7) to 30 N·m (22 lb ft). Ensure that connection (8) does not turn.
- Note:** Ensure that each fuel injection line does not contact any other fuel injection line or any other engine component.
6. Remove the caps from fuel priming pump (5) and from the plastic tube assemblies.
 7. Connect plastic tube assembly (4) to the fuel return. Secure the plastic tube assembly with the clip.
 8. Connect plastic tube assembly (3) to the fuel priming pump. Secure the plastic tube assembly with the clip.
 9. Install plastic tube assembly (6).
 10. Install the breather tube to the valve mechanism cover. Refer to Disassembly and Assembly, "Crankcase Breather- Remove and Install".

11. If the engine is equipped with a cover over the fuel injectors install the cover. Refer to Disassembly and Assembly, "Fuel Injector Cover - Remove and Install".
12. Turn the fuel supply to the ON position.
13. Turn the battery disconnect switch to the ON position.
14. Remove the air from the fuel system. Refer to the Operations and Maintenance Manual, "Fuel System - Prime".

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i02762537

Fuel Injector Cover - Remove and Install

SMCS - 1254-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

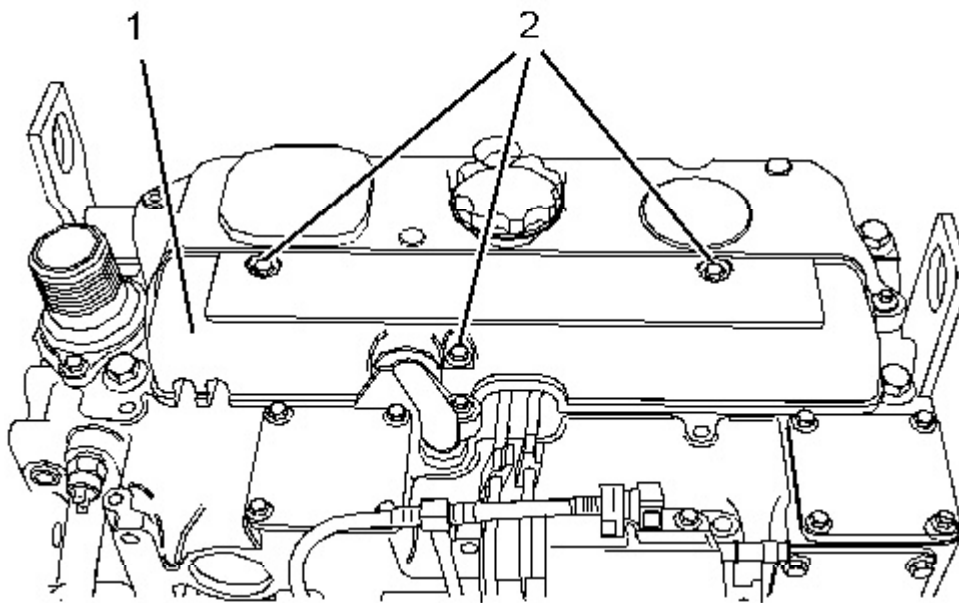


Illustration 1
Typical example

g01319811

1. Thoroughly clean all of the outer surfaces of cover (1).
2. Remove bolts (2) from cover (1).
3. Remove cover (1).

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

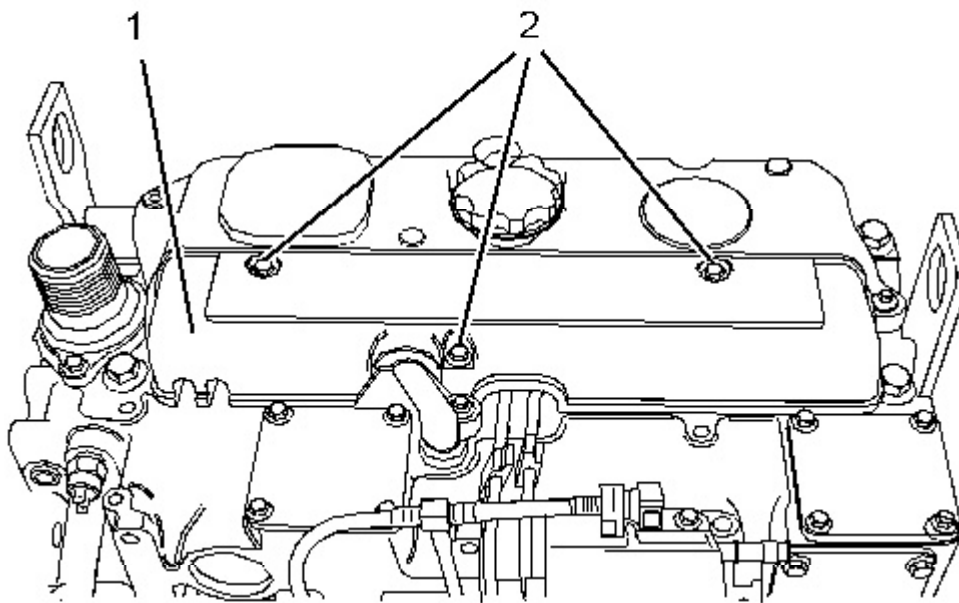


Illustration 2
Typical example

g01319811

1. Thoroughly clean all of the inner surfaces of cover (1).
2. Install cover (1).
3. Install bolts (2). Tighten bolts (2) to a torque of 9 N·m (7 lb ft).

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i02763405

Fuel Injection Pump - Remove

SMCS - 1251-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	230-6283	Timing Pin (Crankshaft)	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

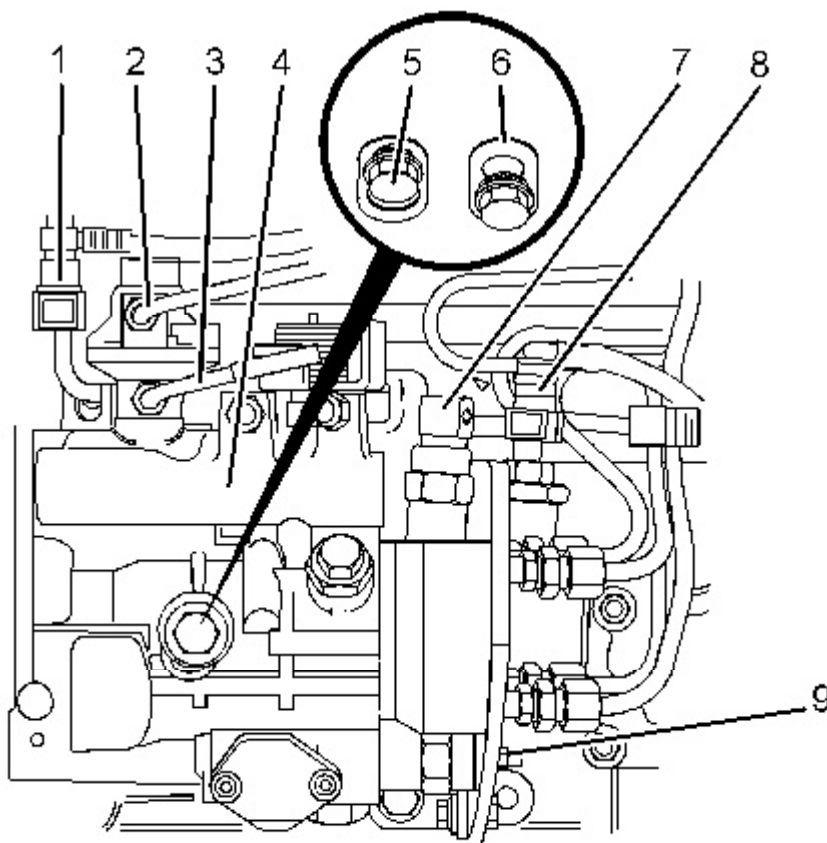
NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Note: Put identification marks on all hoses, on all hose assemblies, on wires and on all tube assemblies for installation purposes. Plug all hose assemblies and tube assemblies. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.

1. Turn the fuel supply to the OFF position.
 2. Turn the battery disconnect switch to the OFF position.
-



Typical example

3. Disconnect plastic tube assemblies (1) and (8) from fuel injection pump (4).
4. Disconnect tube assembly (3) from fuel injection pump (4).
5. Remove the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove".
6. Remove tube assembly (2).
7. Disconnect the harness assembly from solenoid (7).
8. Disconnect the harness assembly from solenoid (9).
9. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at the top center position on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Finding Top Centre Position for No.1 Piston".
10. Use Tooling (B) in order to lock the camshaft in the correct position. Use Tooling (C) in order to lock the crankshaft in the correct position. Refer to Disassembly and Assembly, "Gear Group (Front) - Remove" for the correct procedure.
11. Remove the backlash from the fuel pump gear. Lock the fuel injection pump in the correct position and remove the fuel pump gear. Refer to Disassembly and Assembly, "Fuel Pump Gear - Remove and Install" for the correct procedure.
12. Loosen locking screw (5). Rotate spacer (6) in order to allow locking screw (5) to tighten against the shaft of the fuel injection pump. Rotate the fuel injection pump gear in a counterclockwise direction in order to remove the backlash. Tighten locking screw (5) to a torque of 17 N·m (13 lb ft).

Note: Locking screw (5) must be tightened in order to prevent the shaft of the fuel injection pump from rotating. The shaft of the fuel injection pump must not be rotated after the fuel injection pump has been removed from the engine.

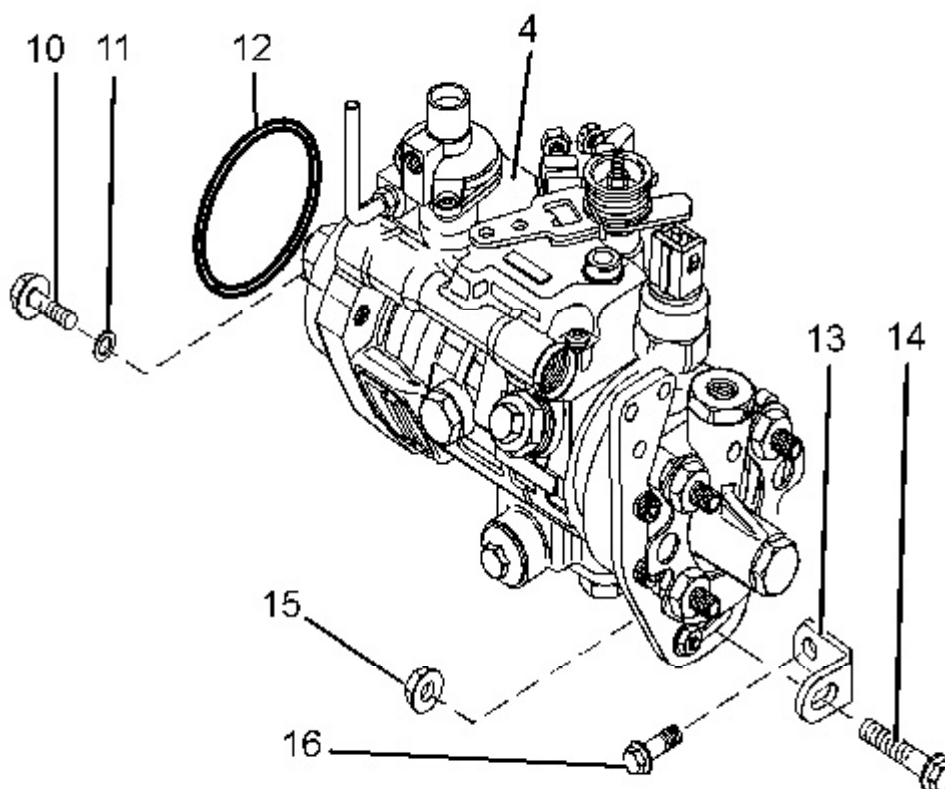


Illustration 2

g01349818

13. Remove nut (15). Remove bolt (14).
 14. Remove bolt (16) and bracket (13) from the cylinder block.
 15. Remove bolts (10) and washers (11) in order to remove fuel injection pump (4).
- Note:** The fuel injection pump should be supported by hand as the bolts are removed.
16. Remove the fuel injection pump from the front housing. Remove O-ring seal (12).

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i05572369

Fuel Injection Pump - Install

SMCS - 1251-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	230-6283	Timing Pin (Crankshaft)	1
D	1U-6396	O-Ring Assembly Compound	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.⁽²⁾ This Tool is used in the aperture for the electric starting motor.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. Inspect the bore in the front housing for damage. If the bore is damaged, replace the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove" and Disassembly and Assembly, "Housing (Front) - Install".
-

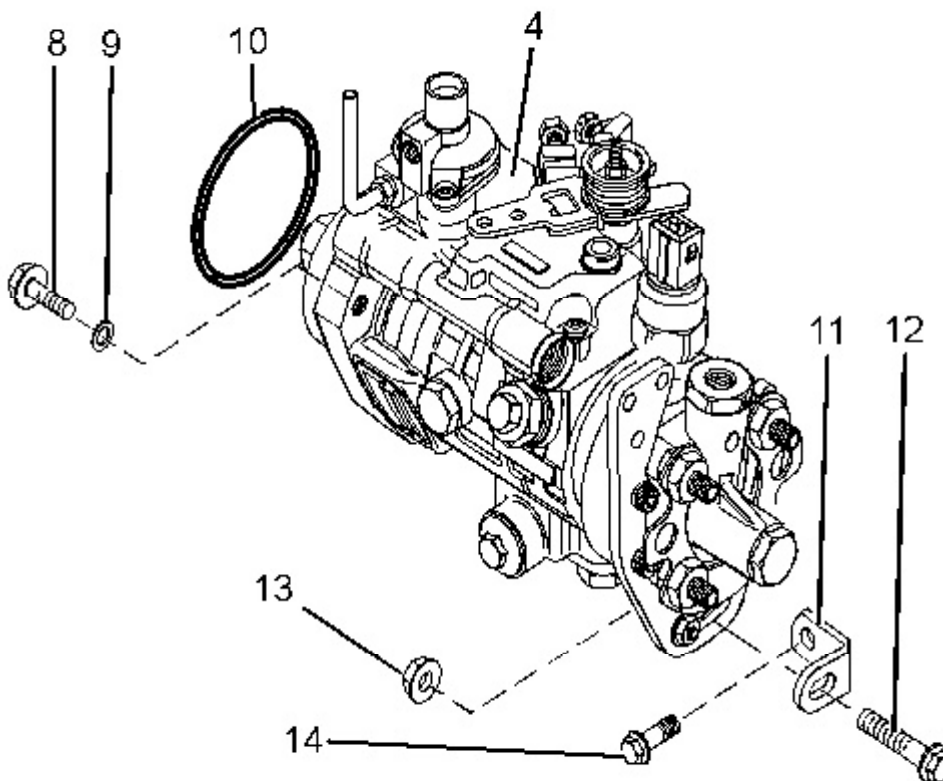


Illustration 1

g01350306

Typical example

2. Use Tooling (D) in order to lubricate O-ring seal (10) . Install a new O-ring seal (10) onto fuel injection pump (4) .

3. Install new washers (9) to bolts (8) .
4. Align the holes in the fuel injection pump with the holes in the front housing. Install fuel injection pump (4) to the housing.

Note: The fuel injection pump should be supported by hand until the bolts are installed.

5. Install bolts (8) . Tighten bolts (8) to a torque of 22 N·m (16 lb ft).
6. Position support bracket (11) onto the cylinder block. Install bolt (14) finger tight.
7. Install bolt (12) and nut (13) finger tight.
8. Tighten bolt (12) and nut (13) to a torque of 22 N·m (16 lb ft). Tighten bolt (14) to a torque of 44 N·m (32 lb ft).

Note: Ensure that the fuel injection pump is not stressed as the bolts for the bracket are tightened.

9. Ensure that the No. 1 cylinder is at top dead center on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Fuel Injection Timing - Check". If necessary, use Tooling (A) in order to rotate the crankshaft so that number one piston is at the top center position on the compression stroke. Refer to Systems Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston".

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

10. Use Tooling (B) in order to lock the camshaft in the correct position. Use Tooling (C) in order to lock the crankshaft in the correct position. Refer to Disassembly and Assembly, "Gear Group (Front) - Remove" for the correct procedure.
11. Install the fuel injection pump gear to fuel injection pump (4) . Refer to Disassembly and Assembly, "Fuel Injection Pump Gear - Install" and refer to Disassembly and Assembly, "Gear Group (Front) - Install".

Note: Ensure that the fuel injection pump is in the unlocked position after the installation of the fuel injection pump gear is completed.

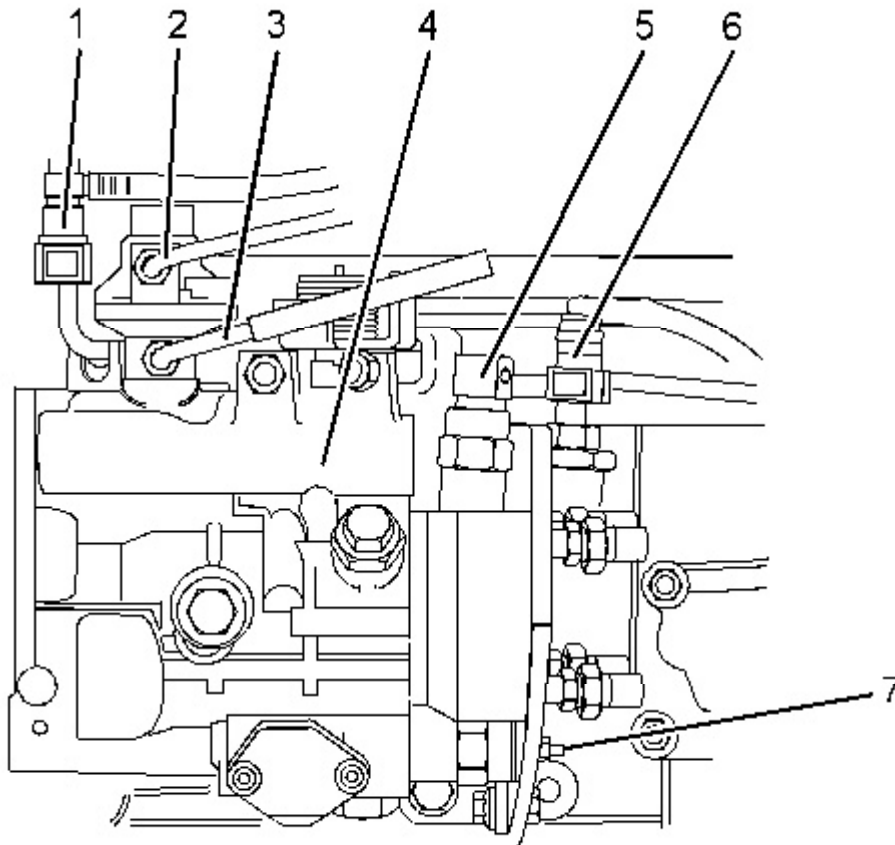


Illustration 2

g01350305

Typical example

12. Remove the plugs and caps from ports and tube assemblies.
13. Install the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Install".
14. Connect plastic tube assemblies (1) and (6) to fuel injection pump (4) .
15. Connect tube assembly (3) to fuel injection pump (4) .
16. Install tube assembly (2) .
17. Connect the harness assembly to solenoid (7) . Tighten nut (7) to a torque of 4 N·m (35 lb in).
18. Connect the harness assembly to solenoid (5) .
19. Turn the fuel supply to the ON position.
20. Turn the battery disconnect switch to the ON position.

End By: Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".

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Product: BACKHOE LOADER

Model: 444F2 BACKHOE LOADER LYL

Configuration: 444F2 Side Shift Backhoe Loader LYL00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly

C4.4 (Mech) Engines for Caterpillar Built Machines

Media Number -KENR9210-09

Publication Date -01/12/2014

Date Updated -13/07/2017

i02762569

Fuel Injection Pump Gear - Remove

SMCS - 1251-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	230-6283	Timing Pin (Crankshaft)	1
D	1P-2320	Combination Puller	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install".

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE

Keep all parts clean from contaminants.

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